

REMARKS

Favorable reconsideration of this application in light of the following discussion is respectfully requested.

Claims 1 and 5-17 are presently active in this case. The present Amendment amends independent Claim 14 and adds new Claims 15-17.

In the outstanding Office Action, Claims 1 and 5-14 were rejected under 35 U.S.C. § 103(a) as being unpatentable over O'Connor (U.S. Patent No. 4,800,113) in view of Kent (European Patent No. EP 0,630,735A2) and Nemoto et al. (Japanese Patent No. JP 04-201412A, herein referred as Nemoto) further taken with either one of Schermutzki (U.S. Patent No. 4,743,187) or Baumann (UK patent No. UK 2,040,801A) and optionally further taken with Francis, Jr. (U.S. Patent No. 2,543,101, herein referred as Francis).

Claim 14 has been amended to overcome a minor formality.

In response to the rejection of Claims 1 and 5-14 under 35 U.S.C. §103(a), Applicants respectfully request reconsideration of the rejection and traverse the rejection as discussed next.

Briefly recapitulating, Applicants' invention relates to a process for continuously manufacturing a rigid void-free composite product by continuously depositing onto a moving conveyor two layers, one of two layers including the plurality of continuous threads, the other one of the two layers including the strip of fabric. The claimed invention thus leads to improved rigid void-free composite products.¹

Turning now to the applied prior art, O'Connor discloses a process for preparing fiber reinforced thermoplastic articles wherein thermoplastic fibers and reinforcement fibers can be intermingled to produce a composite yarn, which is used to weave a fabric. O'Connor, however, fails to teach or suggest Applicants' claimed depositing of two layers onto a moving

¹ See Applicants' specification at page 1, lines 4-8 and in the Claims.

conveyor, one layer including the plurality of continuous threads, the other one including the strip of fabric. In particular, the O'Connor patent fails to teach or suggest the claimed two layers deposited onto a moving conveyor. The outstanding Office Action asserts that O'Connor teaches these features. Applicants respectfully disagree. O'Connor teaches that the fabric prepared from hybrid yarns is laminated by placing 2 to 10 plies of fabric, cut to a size of about 9" to 10" in a metal mold cavity² and further teaches that before melting a hybrid yarn can be prepared, woven into a fabric or chopped and layed up as a batt of non-woven fibers.³ A fabric prepared from hybrid yarns cut to a size of about 9" to 10" or a hybrid yarn chopped and layed up as a batt is **not** the process of depositing **two layers continuously onto a moving conveyor**, one layer including the plurality of continuous threads, the other one including the strip of fabric, as claimed by Applicants.

Furthermore, the present invention allows to manufacture *continuously* a composite product in a void-free sheet form, which combines moldability of products containing *nonwoven reinforcements* and provides in the final molded article the level of mechanical properties of products containing *woven reinforcements*. In order to obtain this result the composite product is made by depositing continuously two layers on a conveyor: a layer of a strip of fabric made of at least 80% of intimately blended commingled threads containing glass filaments and filaments of thermoplastic organic material (woven reinforcement), and a layer in the form of continuous threads continuously deposited either in the direction of the movement of the conveyor or as superposed loops, or in form of chopped threads.

O'Connor discloses a discontinuous process which consists in stacking several layers of fabric or bat chopped fibers made of a composite yarn obtained by intermingling reinforcement filaments and thermoplastic filaments. According to O'Connor, the layers are always identical (fabric or bat chopped fibers). It is not taught or suggested to mix layers of

² See O'Connor at page 5, lines 11-16.

³ See O'Connor at page 1, lines 50-57.

fabric and bat of chopped fibers in order to give the sheet particular properties in regard of the moldability and mechanical properties in the final molded device. The other cited references to not disclose such features either.

None of the other cited references, individually or in combination with O'Connor, teach or suggest the claimed process and the claimed steps. Furthermore, Applicants respectfully traverse the obviousness rejection based on the combination of the O'Connor and Francis patents because there is insufficient evidence for a motivation to combine Francis' method of making felt-like fibrous bats with O'Connor's process for preparing fiber reinforced thermoplastics, for the following reasons.⁴

O'Connor prepares fiber-reinforced thermoplastic articles by subjecting the composite fabric to elevated temperature (300°C) and pressure (200psi) in order to allow the escape of any air entrapped in the composite fabric or composite. O'Connor, however, does not suggest that melting the thermoplastic material under pressure for intimate contact between the molten thermoplastic material and the fiber reinforcement material would work with a method of making felt like fibrous bats. Francis does not state that the fibers in the bat or web being bonded together due to activation of the potentially adhesive fibers need a "melted thermoplastic material to come into intimate contact with the reinforcement fibers."⁵

In addition, Francis is not concerned by the producing of a fiber-reinforced thermoplastic article. Instead, Francis is concerned with in providing felt-like fibrous bats⁶ and that a composite product is formed from at least felt like bat or web, so as to leave at least

⁴ See MPEP 2143.01 stating "[o]bviousness can only be established by combining or modifying the teaching of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art," (citations omitted). See also MPEP 2144.08 III stating that "[e]xplicit findings on motivation or suggestion to select the claimed invention should also be articulated in order to support a 35 U.S.C. 103 ground of rejection. . . Conclusory statements of similarity or motivation, without any articulated rational or evidentiary support, do not constitute sufficient factual findings."

⁵ See O'Connor at column 4, lines 27-32.

⁶ See Francis at column 1, lines 39-43.

one exposed surface exhibiting felt-like characteristics.⁷ Francis states that its structure already achieves the goal of providing felt-like products which combine in a single structure the properties of thickness, low density and high permeability.⁸ The Francis system does not suggest that further improvement is desired, nor that another feature should be added to further improve the felt like layer securely and permanently anchored to a textile layer. In particular, the Francis method does not suggest to add a process of melting thermoplastic material to provide a intimate contact of the thermoplastic material with the reinforcement, such as those disclosed in O'Connor.

The O'Connor and Francis patents, therefore, do not provide the motivation to perform the proposed modification of the O'Connor process. In other words, an attempt to bring in the isolated teaching of Francis' method of making a felt-like fibrous bat by anchoring a felt-like layer to a textile layer into the O'Connor process would amount to improperly picking and choosing features from different references without regard to the teachings of the references as a whole.⁹ While the required evidence of motivation to combine need not come from the applied references themselves, the evidence must come from *somewhere* within the record.¹⁰ In this case, the record fails to support the proposed modification of the O'Connor system.

In order to vary the scope of protection recited in the claims, new dependent claims are added. New Claim 15 depends upon Claim 1 and recites a process for continuously manufacturing a rigid void-free composite product, by transferring two layers through a zone

⁷ See Francis at column 2, lines 15-26.

⁸ See Francis, at column 1, lines 1-7.

⁹ See In re Ehrreich 590 F2d 902, 200 USPQ 504 (CCPA, 1979) (stating that patentability must be addressed "in terms of what would have been obvious to one of ordinary skill in the art at the time the invention was made in view of the sum of all the relevant teachings in the art, not in view of first one and then another of the isolated teachings in the art," and that one "must consider the entirety of the disclosure made by the references, and avoid combining them indiscriminately.")

¹⁰ In re Lee, 277 F.3d 1338, 1343-4, 61 USPQ2d 1430 (Fed. Cir. 2002) ("The factual inquiry whether to combine references ... must be based on objective evidence of record. ... [The] factual question of motivation ... cannot be resolved on subjective belief and unknown authority. ... Thus, the Board must not only assure that the requisite findings are made, based on evidence of record, but must also explain the reasoning by which the findings are deemed to support the agency's conclusion").

where the two layers are heated and cooled comprising the steps of passing the two layers through a first heating process, a second heating process, a first cooling process and a second cooling process. New Claims 16 and 17 depend upon Claim 13 or 14 respectively, to recite a pair of adjacent heating rollers and a pair of adjacent cooling rollers. New Claims 15-17 find support in the disclosure as originally filed. Specifically, Claims 15-17 find non-limiting support at page 10, lines 9-24 with corresponding Fig. 1 and Fig. 2. Therefore, Claims 15-17 are not believed to raise a question of new matter.¹¹

Turning now to the applied prior art, O'Connor teaches a fabric prepared from hybrid yarns by compressing them at a temperature of about 595°F. The composite is then removed from the hot press, placed in a second press at room temperature and allowed to cool under 200psi pressure.¹² However, the O'Connor patent fails to teach applicants' second cooling process configured to cool the two layers with additional two adjacent rolls.

Kent teaches that the filaments are quenched with air and drawn over heated godets¹³ and that the yarn is knitted into a tube, and that four layers of knit tubes are stacked together and molded in a hydraulic press at 450°F.¹⁴ The Kent patent fails to teach or suggest Applicants' first and second cooling process. In particular, Kent remains silent on a first cooling process configured to **cool and press** the two layers.

Kent also discloses a reinforcing composite made of a multicomponent yarn having a thermoplastic matrix component and a fibrous thermoplastic reinforcement component. Both of these components are thermoplastic. The yarn is used in form of a fabric, optionally combined with an identical or different thermoplastic material in the form of a sheet or a film. If the teachings of Kent and O'Connor were combined, the composite yarn of O'Connor would have to be replaced with the multicomponent yarn of Kent. But there is no motivation

¹¹ See MPEP 2163.06 stating that "information contained in any one of the specification, claims or drawings of the application as filed may be added to any other part of the application without introducing new matter."

¹² See O'Connor at column 5, lines 11-19.

¹³ See Kent at column 10, lines 29-32.

¹⁴ See Kent at column 10, lines 29-32 and column 11, lines 6-12.

to have an additional layer in the form of continuous threads disposed in the direction of the movement of the conveyor or as superposed loops or in the form of chopped threads added to the fabric of O'Connor, so as to obtain the composite product cited in Applicants' Claim 1.

Nemoto discloses that the manufacturing method of the composite material thermally melts the thermoplastic resin and then cools the resultant film and fabric under pressure.¹⁵ Although Nemoto mentions cooling, the resultant film and fabric under pressure, the Nemoto patent fails to teach Applicants' first **and second** cooling process.

Schermutzki discloses a production of a glass mat-reinforced thermoplastic, where a mat and a resin are pressed and heated in a compression zone of a dual belt press.¹⁶ Schermutzki's impregnation process may be reinforced by additional heating radiators 12, 12a positioned above the belt conveyors 42, 43 so that both glass fiber mats 4 and 4a may be conveyed to the twin belts press.¹⁷ Schermutzki also discloses additional support rolls 9, 36 that are provided for the lower belt 2, each of which may be heated.¹⁸ The mats are suitably laminated in this zone and may be solidified in the cooling zone 5.¹⁹ Although Schermutzki does teach multiple heating zones (heated support rolls 9, 36, heating installation 7, heating radiators 12, 12a), the system does not teach a first cooling process configured **to cool and press** the two layers and a second cooling process. On the contrary, Schermutzki explicitly teaches that the glass fiber web is easily released from the belts following passage through a cooling zone.²⁰ A cooling zone is not a first and a second cooling zone, as claimed by Applicants.

¹⁵ See Nemoto in the Abstract.

¹⁶ See Schermutzki in the Abstract.

¹⁷ See Schermutzki at column 4, lines 50-55.

¹⁸ See Schermutzki at column 3, lines 41-43.

¹⁹ See Schermutzki at column 4, lines 62-64 and in Fig. 1.

²⁰ See Schermutzki at column 1, lines 60-66.

Baumann discloses a method of preparing a fiber glass reinforced resin by feeding glass mat(s) to a heating zone 120 and cooling the mat(s) in a cooling zone 130.²¹ Baumann further discloses two distinct sections 120 and 130, section 120 is the hot lamination zone of the process, and the laminate passes from zone 120 into zone 130 and zone 130 is supplied with heat transfer fluid that removes heat from the laminate to chill the laminate.²² However, the Baumann patent fails to teach a first and second heating process as well as a first and second cooling process, second cooling process comprising two adjacent rollers.

Francis discloses a method of making composite fibrous products, and the product passes from the heating zone between rollers 28 and 29 and directly into a confined cooling or desactivating zone, at which point cool air is directed on the product by blower.²³ Francis therefore teaches the presence of a heating zone and a cooling zone, however, the heating as well as the cooling is performed by action of blowers 26, 30.²⁴ A blower, as suggested by Francis, and air drawn into the heating cabinet 23 through inlet 24 directed onto product²⁵ is not a process configured to heat or to cool **and press** the two layers, as claimed by Applicants.

Therefore, even if the combination of O'Connor with any of the secondary references Kent, Nemoto, Schermutzki, Baumann and Francis is assumed to be proper, the combination fails to teach every element of the invention recited in Claims 15-17. Therefore, the prior art fails to teach or suggest every feature recited in Applicants' claims, so that Claims 1 and 5-17 are patentably distinct over the prior art.

Consequently, in view of the present amendment, no further issues are believed to be outstanding in the present application, and the present application is believed to be in

²¹ See Baumann in the Abstract.

²² See Baumann at column 3, lines 25-75.

²³ See Francis at column 9, lines 26-33

²⁴ See Francis at column 9, lines 19-25 and lines 30-33.

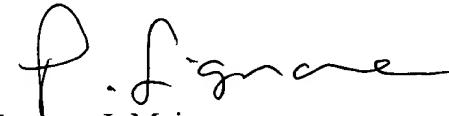
²⁵ See Francis at column 9, lines 19-21.

condition for formal Allowance. A Notice of Allowance for Claims 1 and 5-17 is earnestly solicited.

Should the Examiner deem that any further action is necessary to place this application in even better form for allowance, the Examiner is encouraged to contact Applicant's undersigned representative at the below listed telephone number.

Respectfully submitted,

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